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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BELYAVSKYI, MICHAEL A

ART UNIT

PAPER NUMBER

1644

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/643,982

Applicant(s)

ZIPORI ET AL.

Examiner

Michail A. Belyavskiy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 12-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02/20/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### DETAILED ACTION

1. Applicant's amendment, filed 04/10/06 is acknowledged.

Claims 1-26 are pending.

2. Applicant's election with traverse of Group I, claims 1-11 in the reply filed on 04/10/06 is acknowledged. Applicant traverse the Restriction Requirement on the grounds that the search of all Groups together would not constitute a serious search burden on the examiner and that search of the claims of Group I would provide useful information for the claims of Groups II-VI.

This is not found persuasive because the MPEP 803 (August 2001) states that "For purposes of the initial requirement, a serious burden on the examiner may be prima facie shown if the examiner shows by appropriate explanation either separate classification, separate status in the art, or a different field of search". The Restriction Requirement enunciated in the previous Office Action meets this criteria and therefore establishes that serious burden is placed on the examiner by the examination of more than one Group. The Inventions are distinct for reasons elaborated in paragraphs 3-5 of the previous Office Action and above

The requirement is still deemed proper and is therefore made FINAL.

Claims 12-26 are withdrawn from further consideration by the Examiner, 37 C.F.R. § 1.142(b) as being drawn to nonelected inventions.

*Claims 1-11 reads on an isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon are under consideration in the instant application.*

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

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4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention *to which the claims are directed*.

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

*The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.*

6. Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated polynucleotide consisting a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2 ; an antisense DNA molecule to said polynucleotides ; an expression vector comprising said polynucleotides and a host cell comprising said vector does not reasonably provide enablement for: (i) any isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-6; or (iii) any antisense DNA molecule to said polynucleotides, claimed in claims 6-7; or (iv) any expression vector, comprising said polynucleotides, as claimed in claims 8-9; or (v) any host cells comprising said vector, claimed in claims 10-11. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The specification does not enable one of skill in the art to practice the invention as claimed without undue experimentation.

The specification does not enable one of skill in the art to practice the invention as claimed without undue experimentation.

Factors to be considered in determining whether undue experimentation is required to practice the claimed invention are summarized *In re Wands* (858 F2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988)). The factors most relevant to this rejection are the scope of the claim, the amount of direction or guidance provided, the limited working examples, the unpredictability in the art and the amount of experimentation required to enable one of skill in the art to practice the claimed invention.

The claims as written encompass the genus of isolated polynucleotide sequences. The genus encompasses nucleic acid sequences wherein such nucleic acid have numerous differences in nucleic acid sequences.

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Applicant discloses a novel polynucleotide consisting of a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2 ; an antisense DNA molecule to said polynucleotides ; an expression vector comprising said polynucleotides and a host cell comprising said vector in the instant application ( see overlapping pages 7-11 and Example 2 of the instant Application). Applicant disclosed that transcripts of said novel polynucleotides are involved in regulation of stem cell growth and differentiation ( see pages 12 and 14 in particular). Applicant only disclosed that “it is anticipated that additional molecular variants of the Ig superfamily will be transcribed and expressed on mesenchymal and/or endothelial cells” ( see page 18 in particular)

Applicant has not taught how to make and/or use : (i) any isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-6; or (iii) any antisense DNA molecule to said polynucleotides, claimed in claims 6-7; or (iv) any expression vector, comprising said polynucleotides, as claimed in claims 8-9; or (v) any host cells comprising said vector, claimed in claims 10-11. The structural and functional characteristics of said nucleic acid molecules are not defined in the claim.

Since the instant fact pattern fails to indicate that representative number of structurally related compounds is disclosed, the artisan would not know the identity of a reasonable number of representative compounds falling within the scope of the instant claims and consequently would not know how to make them. An assay for *finding* a product is not equivalent to a positive recitation of *how to make* a product.

“Comprising” is considered open-ended claim language and expand an isolated polynucleotide to include additional non disclosed nucleic acids sequences outside of the specified sequences. The disclosure of a novel polynucleotide consisting of a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2 that are involved in regulation of stem cell growth and differentiation cannot support the entire genus of : (i) any isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-6; or (iii) any antisense DNA molecule to said polynucleotides, claimed in claims 6-7; or (iv) any expression vector, comprising said polynucleotides, as claimed in claims 8-9; or (v) any host cells comprising said vector, claimed in claims 10-11.

There does not appear to be sufficient guidance in the specification as filed as to how the skilled artisan would make the various polynucleic acids recited in the instant claims. A person of skill in the art would not know which sequences are essential and which sequences are non-essential

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for the function of said polynucleotides i.e. for regulation of stem cell growth and differentiation.

There is insufficient guidance to direct a person of skill in the art to select particular sequences or sequence lengths as essential for the function of a novel polynucleotide consisting of a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2. Moreover, Applicant himself acknowledge that **unexpectedly** the MBA-13 mesenchymal stromal cell line was found to consistently express TCR $\beta$  constant region, while cDNA from negative control tissue did not produce PCR products using primers from the TCR gene (emphasis added, see page 14, lines 10-16, of the specification as filed). As such, the invention must be considered unpredictable. Applicant further acknowledge that cellular and molecular mechanisms that allows for maintenance of hemopoietic stem cells are inadequately understood.

Applicant is relying upon certain biological activities and the disclosure of a limited species to support an entire genus. It is well known that minor structural differences among even structurally related compounds or compositions can result in substantially different biology, expression, and pharmacology of proteins. Therefore, structurally unrelated (i) any isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-6; or (iii) any antisense DNA molecule to said polynucleotides, claimed in claims 6-7; encompassed by the claimed invention would be expected to have greater differences in their activities.

Since the nucleic acid sequence of a polynucleotide determines its protein coding properties, predictability of which changes can be tolerated in a polynucleotides nucleic acid sequence and still retain similar functions and properties requires a knowledge of, and guidance with regard to which nucleic acids within the full-length nucleotide sequence, if any, are tolerant of modification and which are conserved or less tolerant to modification, and detailed knowledge of the ways in which the product's structure relates to its functional usefulness. Because there is no guidance in the specification as to which amino acid sequence within the amino acid sequence of SEQ ID NO: 2, which is encoded by polypeptide consisting of SEQ ID NO:1 that after substitution, deletion or insertion will retain the same function, i.e. regulate stem cell growth and differentiation it is unpredictable to determine which polynucleotide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-5 will have similar function. Since the structure associated with functions of any polynucleotide mentioned above are not disclosed, predicting which polynucleotide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claimed in claims 1-3; or (ii) comprising a truncated  $\mu$

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heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-5 will have the ability to regulate or modulate growth /differentiation of stem cells is well outside the realm of routine experimentation.

Attwood (Science 2000; 290:471-473) teaches that “[i]t is presumptuous to make functional assignments merely on the basis of some degree of similarity between sequences. Similarly, Skolnick et al. (Trends in Biotech. 2000; 18(1):34-39) teach that the skilled artisan is well aware that assigning functional activities for any particular protein or protein family based upon sequence homology is inaccurate, in part because of the multifunctional nature of proteins (e.g., “Abstract” and “Sequence-based approaches to function prediction”, page 34). Even in situations where there is some confidence of a similar overall structure between two proteins, only experimental research can confirm the artisan’s best guess as to the function of the structurally related protein (see in particular “Abstract” and Box 2). Finally, even single amino acid differences can result in drastically altered functions between two proteins. For example, Metzler et al. (Nature Structural Biol. 1997; 4:527-531) show that any of a variety of single amino acid changes can alter or abolish the ability of CTLA4 to interact with its ligands CD80 and CD86 (e.g., summarized in Table 2).

Reasonable correlation must exist between the scope of the claim and the scope of enablement set forth. Without sufficient guidance, the changes which can be made in the instantly recited any isolated polynucleotide sequences and still maintained the functional properties of polynucleotide consisting of a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2 is unpredictable, as is the identity of which fragments would encode a functional polypeptide since the amino acids encoding a particular functional activity do not appear to have been identified; thus the experimentation left to those skilled in the art is unnecessary, improperly, extensive and undue.

Thus, Applicant has not provided sufficient guidance to enable one skill in the art to make and use (i) any isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-6; or (iii) any antisense DNA molecule to said polynucleotides, claimed in claims 6-7; or (iv) any expression vector, comprising said polynucleotides, as claimed in claims 8-9; or (v) any host cells comprising said vector, claimed in claims 10-11 in the manner reasonably correlated with the scope of the claims. The scope of the claims must bear a reasonable correlation with the scope of enablement. *In re Fisher*, 166 USPQ 18 (CCPA 1970) indicates that the more unpredictable an area is, the more specific enablement is necessary in order to satisfy the statute.

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In view of the quantity of experimentation necessary, the unpredictability of the art, the lack of sufficient guidance in the specification, the limited working examples, and the limited amount of direction provided given the breadth of the claims, it would take undue trials and errors to practice the claimed invention.

7. Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant is in possession of: an isolated polynucleotide consisting a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2; an antisense DNA molecule to said polynucleotides; an expression vector comprising said polynucleotides and a host cell comprising said vector

Applicant is not in possession of: (i) any isolated polypeptide comprising a transcript of an Ig gene, the polynucleotide lacking V region sequence and comprising a constant domain and joining region sequences and a 5' intronic J sequence upstream of the J region sequence including an in-frame methionine codon, claimed in claims 1-3; or (ii) comprising a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6, claimed in claims 4-6; or (iii) any antisense DNA molecule to said polynucleotides, claimed in claims 6-7; or (iv) any expression vector, comprising said polynucleotides, as claimed in claims 8-9; or (v) any host cells comprising said vector, claimed in claims 10-11.

The claimed invention is drawn to a genus of an isolated polynucleotide, however, structural identifying characteristics of the genus are not disclosed. There is no evidence that there is any *per se* structure/function relationship between the disclosed isolated polynucleotide consisting a truncated  $\mu$  heavy chain of SEQ ID NOs: 1,3, 4, 5 and 6 or encoding a peptide consisting of SEQ ID NO:2 that are involved in the regulation of stem cell growth and differentiation and any others that might be found using the claimed method.

A description of what a material does rather than of what it is, usually does not suffice. The patent does not more than describe the desired function of the compound called for and contains no information by which a person of ordinary skill in the art would understand that the inventors possessed the claimed invention. At best, it simply indicates that one should run tests on a wide spectrum of compounds in the hope that at least one of them will work. Inadequate written description that merely identifies a plan to accomplish an intended result "is an attempt to preempt the future before it has arrived" *Fiers v. Revel*, 984 F.2d 1164, 1171 9Fed.Cir. 1993).

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Applicant has disclosed a limited number of species; therefore, the skilled artisan cannot envision all the contemplated polynucleotide sequence possibilities recited in the instant claims. Consequently, conception in either case cannot be achieved until a representative description of the structural and functional properties of the claimed invention has occurred, regardless of the complexity or simplicity of the method. Adequate written description requires more than a mere statement that it is part of the invention. The sequences themselves are required. See Fiers v. Revel, 25 USPQ2d 1601, 1606 (CAFC 1993).

A description of a genus of polynucleotide sequences may be achieved by means of a recitation of a representative number of polypeptide sequences, defined by amino acid sequence, falling within the scope of the genus, or of a recitation of structural features common to the genus, which features constitute a substantial portion of the genus. Regents of the University of California v. Eli Lilly & Co., 119 F3d 1559, 1569, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

Vas-Cath Inc. v. Mahurkar, 19 USPQ2d 1111, makes clear that “applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. The invention is, for purposes of the written description inquiry, whatever is now claimed.” (See page 1117.) The specification does not “clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed.” (See Vas-Cath at page 1116.) Consequently, Applicant was not in possession of the instant claimed invention. See University of California v. Eli Lilly and Co. 43 USPQ2d 1398.

Applicant is directed to the Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, ¶ 1 “Written Description” Requirement, Federal Register, Vol. 66, No. 4, pages 1099-1111, Friday January 5, 2001.

8. No claim is allowed.

9. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which Applicant may become aware in the specification.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michail Belyavskyi whose telephone number is 571/272-0840. The examiner can normally be reached Monday through Friday from 9:00 AM to 5:30 PM. A message may be left on the examiner's voice mail service. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Chan can be reached on 571/272-0841.

The fax number for the organization where this application or proceeding is assigned is 571/273-8300

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



MICHAIL BELYAVSKYI, PH.D.  
PATENT EXAMINER

5/26/06